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Tuna Newsletter

National Marine Fisheries Service
- Southwest Region
- Southwest Fisheries Center

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Wes Parks, Editor

THE U.S. TUNA INDUSTRY IN SECOND QUARTER 1988

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Seventy vessels of the U.S. tropical tuna purse seine fleet were at sea at least one day during the second quarter of 1988, up one vessel from the number active in the second quarter of 1987 (Table 1). Total capacity at sea was up marginally.

Table 1. Number of active U.S. purse seine vessels and capacity (st) in the second quarter of 1988 and 1987.

AREA	1988	1987
	No. of vessels	
W. ATL	0	0
E. PAC	41	37
W. PAC	29	32
TOTAL	70	69
	Capacity	
W. ATL	0	0
E. PAC	39,895	35,295
W. PAC	36,875	39,975
TOTAL	76,770	75,270

Receipts of all tuna species by U.S. canneries during the second quarter of 1988 totaled 125,482 short tons (st), down 4% from second-quarter 1987 receipts and down 6% from recent long-term (1983-1987) average second-quarter receipts (Table 2). Deliveries in the second quarter from domestic sources, 69,267 st, were off 6% from second-quarter 1987 domestic deliveries while imports, 56,215 st, were essentially the same as in second quarter 1987.

Skipjack and yellowfin dominated deliveries of raw tuna to U.S. canneries in the second quarter of 1988, comprising 45% and 35% of total deliveries.

Deliveries of albacore to U.S. canneries in the second quarter of 1988 were 25,214 st, 26% greater than deliveries in the second quarter of 1987 and 9% greater than recent average second-quarter deliveries. The eastern Atlantic and western Pacific Oceans were the major fishing areas for albacore delivered to

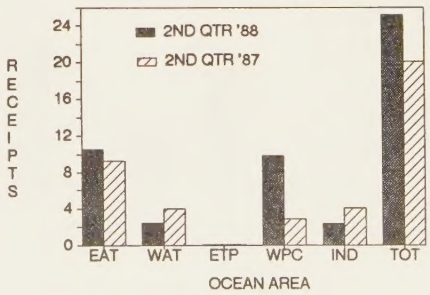

Fig. 1. Receipts (1000 st) of albacore to U.S. canneries by ocean area of capture in the second quarter of 1988 and 1987.

U.S. canneries in second-quarter 1988 (Figure 1).

Second-quarter deliveries of skipjack tuna to U.S. canneries were 55,833 st, up 28% from 1987 but down 5% from recent average second-quarter deliveries. The western and eastern Pacific Oceans were the major fishing areas for skipjack delivered to U.S. canneries in second-quarter 1988 (Figure 2).

U.S. cannery receipts of yellowfin tuna in the second quarter of 1988 were 44,435 st, down 34% from 1987 deliveries and off 13% from long-term (1983-1987) second-quarter deliveries. The major fishing areas contributing to deliveries were the eastern tropical Pacific and western Pacific Oceans (Figure 3).

Tuna fisheries of seven nations provided 90% of the raw, frozen tuna imported to U.S. canneries in the second quarter of 1988 (Table 3). Major suppliers were Taiwan, South Korea and Vanuatu. Comparable statistics are not available for 1987 since data for 1987 and earlier do not differentiate imports by flag of catcher vessel from imports by country of export.

Actual prices paid by canneries for raw, frozen tuna are a function of many variables and typically are different for each load received. An index of price is the contract price for U.S. vessels delivering to U.S. canneries. As noted in previous issues, U.S. contract prices (canneries in Puerto Rico) increased dramatically between second- and third-quarter 1987. Prices increased again between fourth-quarter 1987 and first-quarter 1988 then declined slightly in second quarter 1988. The second-quarter price for 7.5 lb and above skipjack tuna in 1988 was $1,010 per st, up 35% from the price in second-quarter 1987 (table 4). The second-quarter price for 20 lb plus yellowfin was $1,150 per st, up 31% from the second-quarter 1987 price. Prices reported are those paid to U.S. domestic contract vessels and do not apply to deliveries by non-contract domestic and foreign vessels in which case prices vary according to market conditions.

Wholesale list prices asked by canneries and brokers for canned product are also a function of many variables. Though actual wholesale

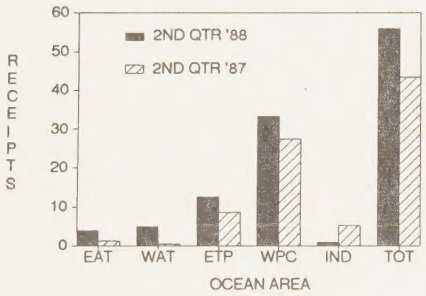

Fig. 2. Receipts (1000 st) of skipjack tuna to U.S. canneries by ocean area of capture in the second quarter of 1988 and 1987.

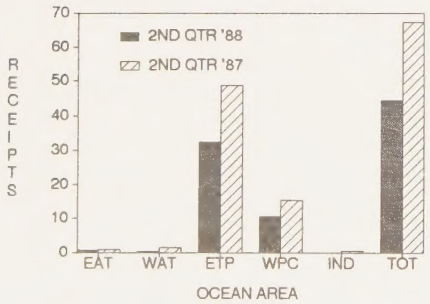

Fig. 3. Receipts (1000 st) of yellowfin tuna to U.S. canneries by ocean area of capture in the second quarter of 1988 and 1987.

Table 2. U.S. cannery receipts (st) of domestic and imported raw tuna by species in the second quarter of 1988 and 1987.

		SPECIES			
YEAR	SOURCE	ALB	SJ	YF[1]	TOTAL
1988	Domestic	1,954	36,040	31,273	69,267
	Imported	23,260	19,793	13,162	56,215
	Total	25,214	55,833	44,435	125,482
1987	Domestic	14	28,689	45,245	73,948
	Imported	20,074	14,829	21,991	56,894
	Total	20,088	43,518	67,236	130,842
AVG 83-87	Domestic	201	31,447	32,862	64,509
	Imported	23,027	27,600	18,119	68,747
	Total	23,228	59,047	50,981	133,256

[1]Includes a small amount of bigeye, blackfin and bluefin tuna

Table 3. U.S. cannery imports (st) of raw tuna by species and flag of catcher vessel in the second quarter of 1988.

	SPECIES			
COUNTRY	ALB	SJ	YF[1]	TOTAL
Taiwan	15,958	458	888	17,304
S. Korea	1,569	4,848	2,080	8,497
Vanuatu	0	3,589	3,507	7,096
Brazil	10	4,996	46	5,052
Ghana	0	3,915	787	4,702
Japan	4,188	0	0	4,188
Venezuela	10	320	3,194	3,524
Other	1,525	1,667	2,660	5,852
Total	23,260	19,793	13,162	56,215

[1]Includes a small amount of bigeye, blackfin and bluefin tuna.

Table 4. Contract prices (U.S.$ per st) for raw, frozen skipjack and yellowfin tuna delivered by U.S. vessels to U.S. canneries in Puerto Rico in the second quarter of 1988 and 1987.

	SKIPJACK		YELLOWFIN	
SIZE CLASS (lbs)	**1988**	**1987**	**1988**	**1987**
20 +			1,150	880
7.5 to 20	1,010	750	1,025	750
4 to 7.5	945	700	945	700
3 to 4	735	500	800	500
under 3	460	300	460	300

Table 5. Wholesale list price (U.S. $ per case) in California for tuna canned in water for representative case packs in the second quarter of 1988 and 1987.

CASE PACK	YEAR	ADVERTISED LABEL	PRIVATE LABEL
White meat[1]	1988	59.50 - 63.75	51.00 -51.50
	1987	55.40 - 55.95	42.00 -44.00
Light meat[2]	1988	42.45 - 45.00	29.00 -32.50
	1987	34.20 - 43.45	23.00 -24.50

[1]Solid, 12.5oz (24).
[2]Chunk, 6.5oz (48).

price for any particular transaction is not known, an index of price is price reported periodically by cannery representatives and brokers. As noted in previous issues, reported wholesale list prices in California for tuna packed in water changed from second quarter and third quarter 1987. Second-quarter 1988 wholesale prices remained essentially at fourth-quarter 1987 and first-quarter 1988 levels. Second-quarter 1988 price for advertised-label, white meat tuna canned in water ranged between $59.50 and $63.75 per case of 24, 12.5 oz cans, up 6% to 15% from the second-quarter 1987 price (Table 5). The price range for private-label, white meat tuna was $51.00 to $51.50 per case, up 16% to 23%.

Reported wholesale list prices in the second quarter of 1988 for advertised-label, light meat tuna canned in water were $42.45 to $45.00 per case of 48, 6.5 oz cans, up as much as 32% from second-quarter 1987 prices. Prices for private-label, light meat tuna were $29.00 to $32.50 per case, up 18% to 41%.

Imports of canned tuna to the U.S. in 1988 continue to run ahead of both 1987 imports and recent long-term (1983-1987) average imports (Figure 4). Cumulative 1988 imports (through the second quarter) of canned tuna not in oil, 178 million pounds, exceeded cumulative 1987 imports by 36%. Cumulative imports exceeded recent average imports by 64%. Imports of canned tuna to the U.S. in excess of an annual quota are subject to increased duty. By the end of the second quarter of 1988, imports exceeded the 1988 quota of 85.2 million pounds by 109%.

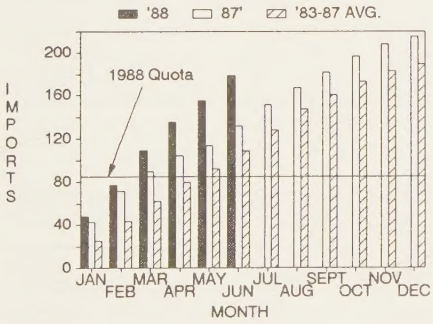

Fig. 4. Cumulative imports (millions of lbs) of canned tuna not in oil to the U.S. through the second quarter of 1988 compared to the 1988 quota, and 1987 and recent average (1983-1987) second-quarter cumulative imports.

U.S. TUNA IMPORTS FROM LATIN AMERICA, 1980-87

Don Jacobson, NMFS, Foreign Fisheries Analysis
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Latin America is an important source of tuna for U.S. canneries. The U.S. imported 296,400 mt of tuna in 1987 of which 69,000 mt were from Latin America (Table 1). Imports valued at $70 million, represented 23% of all the tuna imported by the United States in 1987 (Fig. 1). More than 95% of these shipments were frozen tuna (primarily yellowfin and skipjack). Latin American shipments to the United States declined in 1987, even though Mexican exporters resumed significant shipments for the first time since 1980 (Fig. 2). All other major Latin American suppliers, except Ecuador, substantially reduced shipments in 1987 (Table 2). The United States imported mostly from Mexico,

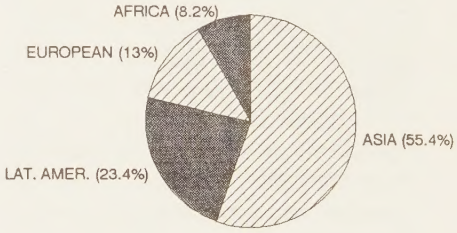

Fig. 1. U.S. imports of tuna by geographic region in 1987.

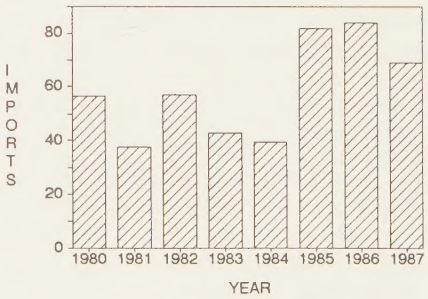

Fig. 2. U.S. imports (in 1000 mt) of tuna from Latin America, 1980-

Venezuela, Panama, Ecuador, and Brazil, which together provided over 95% of total 1987 U.S. imports from Latin America (Fig. 3).

U.S. 1987 tuna imports from Latin America declined for several reasons. On the demand side, U.S. canneries needed less imported tuna both because of decreased demand for tuna on the U.S. market during the last 5 months of 1987 and because of higher catches by the U.S. tuna fleet. The supply of Latin American tuna available for the U.S. market has also changed in recent years. The region's expanding tuna fisheries have enabled Latin American companies to increase total tuna exports from only about 75,000 t in 1980 to a record 176,000 t in 1987, but almost all the increased shipments have gone to markets in the European Community (EC) and Asia (Tables 3 and 4). As a result, the United States is no longer the most important market for Latin American tuna. The 69,000 t shipped to the United States from Latin America in 1987 represented only 40 percent of all Latin American tuna exports (Fig. 4).

Most Latin American tuna is exported frozen. Canneries in several countries are apparently unable to compete with the quality and price of canned tuna from Asia, which comprises most of the canned tuna imported by the United States. Quality control problems have, in the past, caused difficulty for Mexican canners trying to sell their product in the United States. Many Latin American canneries have also suffered from the high cost of imported inputs, such as tin plate for cans.

Table 1. U.S. imports (1000 mt) of tuna by geographic region, 1986 and 1987.

REGION	YEAR 1986	1987
Asia[1]	162.5	163.1
Latin America	83.1	68.9
Western Europe	37.0	38.3
Africa	32.0	24.2
Other	0.1	1.9
Total[2]	314.7	296.4

[1]Does not include American Samoa
[2]Includes Oceania

Table 2. U.S. imports (mt) of tuna from Latin America, by country, 1986 and 1987.

Country or Dependency	Year 1986	1987
Mexico	1,645.8	17,197.7
Venezuela	25,543.0	16,181.1
Panama	20,785.7	14,685.2
Ecuador	13,825.4	13,964.5
Brazil	11,926.1	3,316.9
Uruguay	1,388.5	1,139.5
Trini.-Tobago	3,377.1	730.3
Dom. Rep.	281.1	725.8
Neth. Ant.	3,591.7	366.6
Other	720.3	590.8
Total	83,084.7	68,898.4

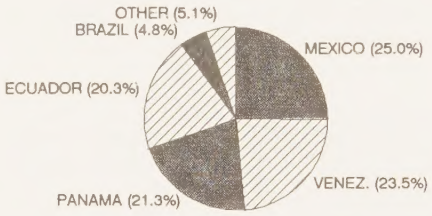

Fig. 3. U.S. imports of tuna by exporting country in 1987.

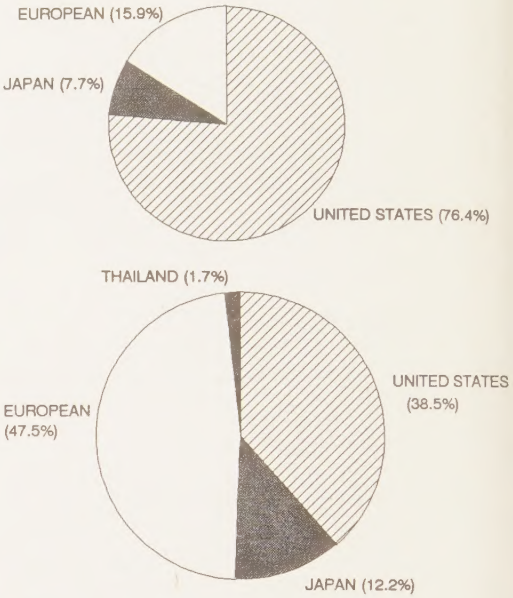

Fig. 4. Latin American exports of tuna by importing country, 1980 (top) and 1987 (bottom).

Table 3. Catches (mt) of tuna by major Latin American countries, 1980-87.

Year	Country Brazil	Ecuador	Mexico	Venez.	Total
1980	6,462	13,793	31,242	NA	51,497
1981	14,754	17,390	67,207	4,995	99,351
1982	17,445	19,777	35,676	NA	72,898
1983	13,426	20,713	26,730	11,676	60,869
1984	8,547	29,903	63,608	17,525	119,582
1985	15,928	32,411	85,670	28,691	134,009
1986	14,946	32,448	113,102	30,076	190,572
1987	8,522*	38,204	95,506	46,378	188,610

*Catch data January-September only.

Table 4. Tuna exports (mt) by Latin American countries to the United States, Japan, the European Community, and Thailand, 1980-87.

Year	United States	Japan	E. Com.	Thailand	Total
1980	56,539	5,713	11,802	Negl.	74,054
1981	37,610	5,555	12,416	Negl.	55,581
1982	56,877	7,992	17,403	Negl.	82,272
1983	42,911	7,248	18,100	Negl.	68,259
1984	39,623	7,980	31,912	Negl.	79,615
1985	81,764	10,704	33,391	NA	126,859
1986	83,085	17,080	62,890	4,629	167,684
1987	68,898	21,789	85,000[1]	3,119	178,086

[1]Projected total, based on January-September statistics.

Brief summaries of the tuna industries of the five most important Latin American tuna fishing countries are as follows:

Mexico: Mexico resumed its position as the leading Latin American supplier of tuna to U.S. canneries in 1987. Mexican exports totaled 17,200 t in 1987, the first full year of shipments to the United States since the lifting of the U.S. tuna embargo in August 1986. Mexican tuna had been banned from the U.S. market since 1980 when Mexican authorities seized several U.S. tuna seiners. Prior to the embargo, Mexican tuna companies have had a major advantage over other Latin American suppliers, as tuna landed at Ensenada could be cheaply trucked across the border to U.S. canneries in San Diego. During the embargo, however, the U.S. tuna canning companies curtailed their operations in San Diego, and expanded those in Puerto Rico. Consequently, most Latin American tuna is now shipped through Panama to canneries in Puerto Rico and Europe. As a result, Mexican tuna fishermen have less of a competitive advantage in the U.S. market than they had before the embargo.

Venezuela: Venezuela was the second most important Latin American supplier of tuna to the U.S. market in 1987. Venezuelan tuna exports totaled 16,200 t in 1987, a decline of 35 percent from the record 25,500 t shipped in 1986. Actual 1987 shipments of Venezuelan-origin tuna may have been much higher, because much of the tuna caught by Venezuelan fishermen was transshipped through foreign ports (mostly in Panama). Although Venezuelan fishermen are required by law to land at least 40 percent of their catch in Venezuelan ports, Government-imposed price controls and exchange rate policies make it highly unprofitable to do so. Some observers estimate that as much as 90 percent of the catch may have been transshipped through foreign ports, forcing many Venezuelan canneries to cease or curtail operations for lack of raw material.

Panama: According to U.S. Census data, Panama was the third leading Latin American supplier of tuna to the U.S. market in 1987, shipping 14,700 tons, a decline of 30 percent from the 20,800 t shipped in 1986. Panama does not have a major tuna fleet of its own, however, and most of the imports reported by U.S. and EC customs officials are tuna caught by foreign-owned vessels registered in Panama, or by foreign fishermen (primarily Mexican, Venezuelan, and United States) who transship their catch at Balboa, Vacamonte, or Taboquilla Island.

Ecuador: Ecuador was the fourth leading supplier of tuna to the U.S. market during 1987, shipping 14,000 t, a slight increase over the 13,800 t exported in 1986. The value of these shipments increased significantly, however, from $11.2 million in 1986 to $16.0 million in 1987, as a result of higher international prices and an abnormally high share of yellowfin in the species mix. Ecuador has an aging tuna fleet, but vessel owners have hesitated to invest in renovations primarily due to high domestic interest rates.

Brazil: Brazil is generally an important supplier of tuna to the U.S. market, but shipments dropped to only 3,300 t in 1987 from the 11,900 t shipped in 1986. The decline was primarily due to lower Brazilian catches and the decline of the dollar. Almost all Brazilian tuna shipped to the United States is skipjack.

In 1984, the U.S. Congress amended the Marine Mammal Act of 1972, imposing new requirements on U.S. and foreign tuna fishermen. Subsequent amendments, which cover tuna fishing on porpoise, were published in March 1988. Latin American countries wishing to continue exporting yellowfin tuna to the United States are required to submit detailed reports on their porpoise protection programs. The deadline for these submissions was August 16, 1988. Only Mexico's submission was received on time. Embargoes on yellowfin tuna from Ecuador, El Salvador, Panama, Spain, Vanuatu, and Venezuela are scheduled to go into effect on October 18, 1988.

Editors Note: The NMFS Branch of Foreign Fisheries Analysis has prepared a detailed 33-page report on Latin American tuna fisheries and export trends which can be purchased for $15.95 (including postage and handling) by requesting "U.S. Tuna Imports from Latin America, 1980-87," (report PB88-220520/GBA) from NTIS, 5285 Port Royal Road, Springfield, Virginia, 22161.

FORECASTING SKIPJACK TUNA AVAILABILITY IN HAWAII

Chris Boggs, SWFC

Catch per unit effort in Hawaii's pole-and-line baitboat fishery for skipjack tuna has always been highly variable, both seasonally and annually. Once the largest commercial fishery in the State, peaking at 7,000 metric tons (t) in 1965, this fishery had declined to about 1,000 t per year by 1985. One cause of this decline was the reduced availability of large (6.8 kg or 15 lb) fish which appears to be correlated with environmental changes.

Beginning in the 1960's, researchers at the NMFS Honolulu Laboratory tried to explain and forecast skipjack tuna availability in Hawaii based on oceanographic variables thought to influence latitudinal distribution. One hypothesis was that adult skipjack tuna, making up the bulk of the catch during the summer, were carried to Hawaii by westward flowing currents that varied in northward extent from year to year. Sea surface temperature and salinity measured at Koko Head on Oahu indicated that intrusion of California Current Exten-

sion water coincided with the seasonal increase in tuna landings, and that when early warming of surface waters indicated a strong influence of this current, greater than average skipjack tuna catches were made. Another hypothesis held that as large skipjack tuna traveled westward from the eastern Pacific the latitudinal distribution of fish was influenced by the southernmost extent of the 20o C isotherm in the months preceding the arrival of fish in Hawaii.

Much variation was not explained by these models. Forecasts based on Koko Head temperatures issued by the Honolulu Laboratory on an informal basis were discontinued in the 1970's because of a poor track record. Interest in skipjack tuna forecasting rekindled when time series analysis showed a sustained decline in the catch of large fish was correlated with a sustained change in sea surface temperatures. Over an 11-year period (1968-78) 91.5% of the variation in the annual catch of large skipjack tuna was attributed to variation in the weighted average latitude of the 20o C isotherm (long 140o W) in January, February, and April, with time lags of 0, 1, and 4 years. These findings were presented at a 1986 workshop on the depressed condition of Hawaii's skipjack tuna fishery, and the fishery community expressed a strong interest in having the Honolulu Laboratory revive the skipjack tuna forecast.

A forecast based on an update of the 20°C isotherm model was issued in May 1987. In the new model the dependent variable was the average annual catch per boat per standard day fished (referred to as "catch rate") instead of the annual catch. In the years covered by the old analysis, standardized effort was highly correlated with catch rate; thus, annual catch reflected fish availability. After 1979, economic factors contributed greatly to a decline in standardized effort and annual catch was no longer a function of fish availability.

In the new model, about 68% of the variation in the annual catch rate of large skipjack tuna over a-24 year period (1960-83) was attributed to variation in the weighted average latitude of the 20o C isotherm. The proportion of large fish in the catch was less predictable but was included in the forecasts so that total catch could be extrapolated (assuming an equivalent level of effort as during the previous year).

A further refined forecast, correcting for the effect of market saturation, was issued in June 1988. Although the 1987 forecast was correct in predicting a catch rate for large aku similar to the catch rate in 1986, the numerical value predicted was too high. At that time, 1984-86 data were not available. The uncorrected catch rate forecast used a standard day fished as defined prior to the 1984 closure of the Hawaiian Tuna Packers cannery. The cannery used to absorb most of the catch during the peak of the season, with the balance going to the fresh fish market. Now, when the fresh market is saturated boats may quit fishing in the middle of a trip, but the effort is still reported as one day fished. An attempt was made to correct the 1988 forecast for this effect, assuming a market ceiling, a monthly distribution of effort equal to the average for 1986-87, and availability based on the forecast, but broken down by month in proportion to the long-term average for the fishery.

The 1988 HAWIIAN SKIPJACK FORECAST

Honolulu Laboratory Forecast: The sea surface temperatures indicate good fishing for large aku (skipjack tuna) in Hawaii in 1988. The uncorrected forecast is for the 1988 catch rate to be about 2,200 lb of large aku per boat per day fished in the pole-and-line bait boat fishery (Fig. 1), with 44% of the pounds landed being large aku (15 lb and up). Large aku will be more available to fishermen than in 1974-83 but not as available as in the best years (1965, 1972, and 1973).

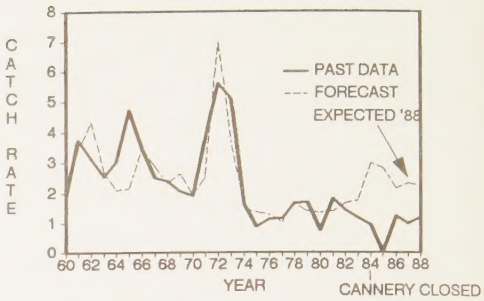

Fig. 1. Annual catch rate (1000 lbs per boat day) for large abu, 1980-1988.

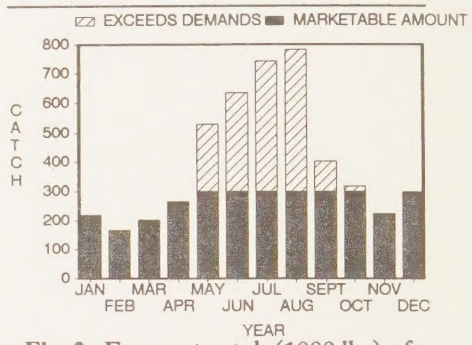

Fig. 2. Forecast catch (1000 lbs) of aku and market demand in 1988.

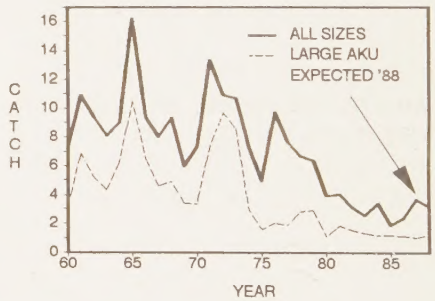

Fig. 3. Annual catch (million pounds) of aku for all sizes and large aku alone, 1960-1987 and forecast 1988 catch.

Market Limitation: The forecast has to be corrected because the baitboat fleet probably will continue to limit its catch to avoid flooding the market (Fig. 2). The corrected forecast indicates that the bait boat catch of large aku in 1988 will be about 1,200 lb of large aku per boat per day fished, with 37% of the

pounds landed being large aku. With this correction, the catch rate for all sizes will be 3,200 lb per boat per day fished, and the total bait boat catch in 1988 is expected to be about 3 million lb (Fig. 3). With a larger market, the same number of boats fishing the same number of days could yield an additional 2 million lb of aku in 1988.

Method of Forecast: The NMFS forecast is based on sea surface temperature isotherms east of Hawaii (Fig. 4) used to predict the average, annual catch rates of aku. Isotherms move from month to month because of seasonal changes. Many things affect daily catch of skipjack tuna, but movements of the isotherms explain a large percentage of the year-to-year changes in the availability of large aku. At least they did until 1984 (Fig. 1).

Since the cannery closed in 1984, catch rates of large aku have not been as high as the NMFS forecasts (Fig. 1). In 1986-87 the total baitboat catch stayed below about 300,000 lb/month, even in months when aku were most available, and apparently was about the most that could be sold fresh for a good price. The difference between the actual catch and the forecast will probably be repeated in 1988. This was the basis for correcting the forecast for 1988.

Details of the Forecast: A "day fished," as used in the forecast, is an average that includes some days of zero catch. The forecast is for boats with bait well capacity greater than 800 gal (class 2). For smaller capacity boats (class 1), predicted catch per day is about 30% lower. The difference is less when fishing is poor. Most of the boats that still fish are class 2 boats

Fishermen say availability of large fish has increased from low levels in 1974-83, but with the current market, fishermen frequently cut fishing trips short when catches are high. No system exists for reporting trips shorter than a standard "day," so data show less fish caught per day fished. This is probably why catch rates were lower than the 1984-87 forecasts.

The aku fishing industry has declined since the 1970's (Fig. 3). Some of this decline was the result of environmental influences on skipjack tuna availability in Hawaii. However, since 1984 the environmental influences have been favorable. Currently, the sustained, low level of aku catches is partly due to the limited market and also that the low number of bait boats operating in Hawaii equal about half that in the 1970's.

As in 1987, the actual catch rates during the first 3 months of 1988 were higher than typical, especially for large aku (Fig. 5). In this sense, 1988 has already been a good year. Based on the corrected forecast with market limitation, catch rates for the remainder of 1988 should stay at similar levels (Fig. 5).

Hawaii Sea-Surface Temperatures: In the past, sea surface temperatures at Koko Head on Oahu were used to make predictions of annual aku catches. Favorable years were predicted when Koko Head sea surface temperatures began increasing before the end of February, as they did this year (Fig. 6). However, last summer and autumn, the Koko Head temperatures were higher than average. Higher-than-average sea surface temperatures were seen the year before each of the five worst years for aku fishing in Hawaii. The isotherms seem to be better predictors than the Koko Head sea surface temperature data.

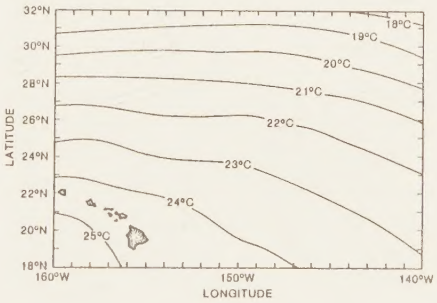

Fig. 4. April 1988 isotherms east of Hawaii

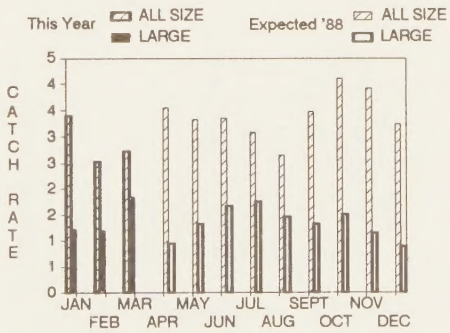

Fig. 5. Monthly catch rates (1000 lb per boat day) Jan-Mar and forecast rates Apr-Dec, 1988

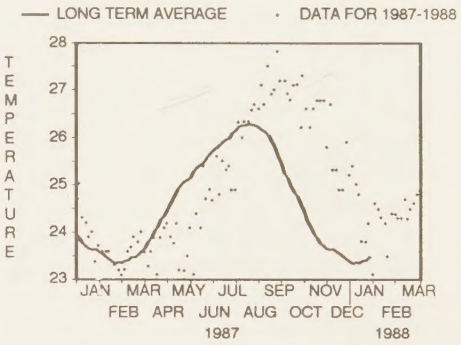

Fig. 6. Koko head sea surface temperatures (°C).

PERFORMANCE OF THE INDIAN OCEAN TUNA PURSE SEINE FLEET GAINS MOMENTUM

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G. Lablache-Carrara - Seychelles Fishing Authority

The performance of the tuna purse seine fleet in the southwest Indian Ocean has improved considerably since it was established in 1983. The 1987 catch was 160,000 mt, eight times the 1983 catch.

The fleet, which is composed primarily of French and Spanish vessels (with three Mauritian and 3 Soviet vessels), has stabilized around 40 vessels in the last three years (Fig. 1). Vessels are based at the Seychelles port of Victoria and operate mostly between 20 deg south and 10 deg north latitude and

between the African coast and 70 deg east longitude (Fig. 2).

Total catch has risen from 20,000 mt in 1983 to 130,000 mt in 1985 and to 160,000 mt in 1987 (Fig. 3). Fleet catch rates have improved progressively from 13 MT/day in 1983 to 18 MT/day in 1987. In the first six months of 1988 monthly catch rates have been consistently higher than in previous years (Fig. 4). Coincidentally, there has been an increase in the percentage of yellowfin in 1988 catches. Yellowfin comprised 68% of the catch for the first six months of 1988 compared to 49% during the first half of 1987 (Fig. 5). This can be at least partly attributed to a change in the fishing pattern to areas where traditionally more yellowfin than skipjack are taken (Fig. 6).

Most of the tuna caught by the southwest Indian Ocean fleet are transhipped by refrigerated vessels to canneries in Europe, Thailand and Puerto Rico. Skipjack is generally sold to canneries in Thailand (70%) and Puerto Rico (30%) while yellowfin, especially yellowfin taken by French and Spanish vessels, are transshipped to Europe (French, Spain and Italy). Since 1980 a cannery of 8,000 mt production capacity has operated on Mauritius (two purse seiners currently operate out of Mauritius). A new cannery of similar capacity was opened in Seychelles in June 1987. Two other canneries, one on Madagascar (10,000 mt capacity) and one on Mauritius, are scheduled to begin operations in the late 1980's.

Vessels of the southwest Indian Ocean fleet typically operate under a license agreement negotiated by the European Economic Community (EEC). The EEC has also signed fishing Agreements with Comores, Madagascar and Mozambique. Agreements guarantee each license state a fixed payment, adjustable at the end of the year, proportional to the fish caught in that state's exclusive economic zone (EEZ). Agreements include provisions for technical assistance or research grants.

In view of its geographical and strategic location and size of its EEZ (approximately 1 million sq km), the Seychelles has benefitted considerably from the establishment of the southwestern Indian Ocean tuna purse seine fishery. To safeguard its

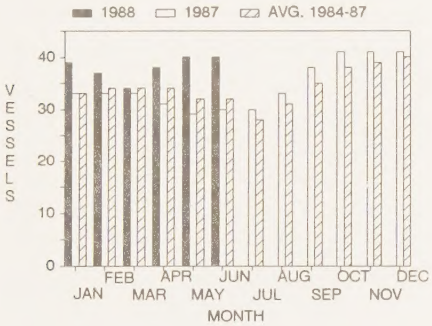

Fig. 1. Number of vessels active by month in the southwest Indian Ocean purse seine tuna fleet, 1988, 1987 and the average for 1984-1987.

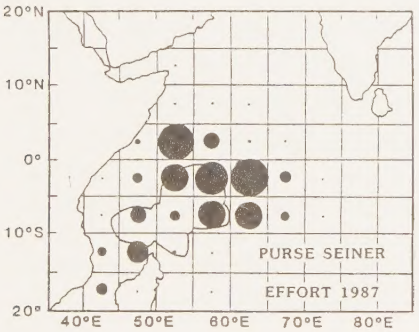

Fig. 2. Distribution of annual effort in 1987.

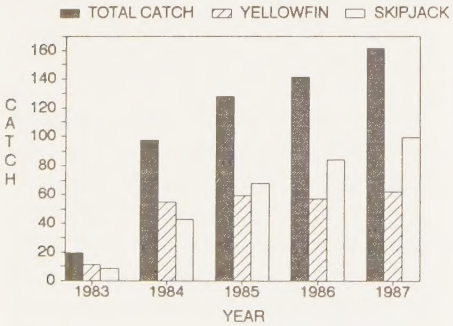

Fig. 3. Catch (1000 mt) by species and total, 1983-1987.

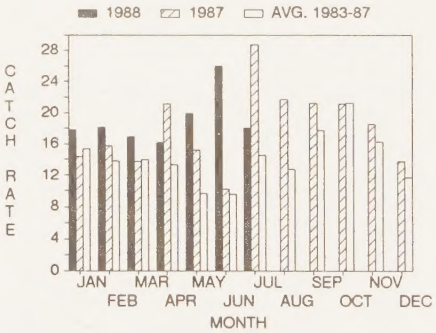

Fig. 4. Catch rate (mt per day) by month, 1988, 1987, and the average for 1983-1987.

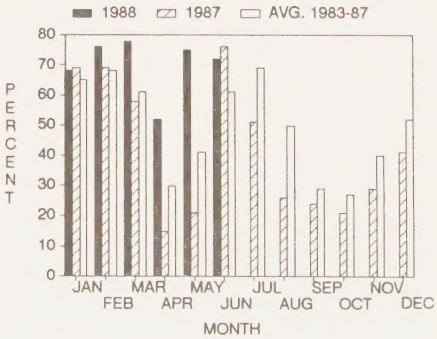

Fig. 5. Percent yellowfin in monthly catches, 1988, 1987 and the average for 1983-1987.

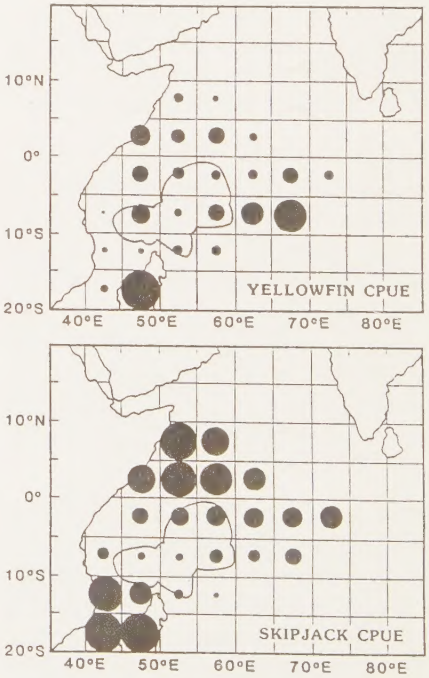

Fig. 6. Areas of high yellowfin catch rate vs. areas of high skipjack catch rate in 1987.

national fishery however, Seychelles not only proclaimed a 200 mile EEZ (in 1979) but established a surveillance system, both features of comprehensive fisheries legislation. Vessels are required to submit catch and effort forms on a per-trip basis and to report their position by radio twice a week. In addition certain areas of the Seychelles EEZ are reserved for local fishermen only. To monitor the fishery a computerized data base system has been set up in close cooperation with the vessel operators. Information on all fleet operations in the southwest Indian Ocean is maintained at the Headquarters of the Seychelles Fishing Authority (SFA). Additional information is generated through SFA scientific staff on board the vessels. Collection and verification of log book data is facilitated by the fact that more than 90% of the tuna is transhipped in Seychelles.

Indian Ocean coastal states are currently considering establishing a regional tuna fishery management organization. At the June meeting of the Indian Ocean Fisheries Commission, held in Mauritius, the decision was made to pursue establishing the organization in collaboration with fishing nations operating in the Indian Ocean.

MEETINGS

- November 2-10, 1988. Annual meeting of the Standing Committee on Research and Statistics. International Commission for the Conservation of Atlantic Tunas (ICCAT). Madrid, Spain. O. Rodriquez-Martin, ICCAT, Principe de Vergara, 17, 28001 Madrid, Spain.

- November 14-16, 1988. Special meeting of the Commission. ICCAT. Madrid, Spain. O. Rodriquez-Martin, ICCAT.

RECENT DEVELOPMENTS

EASTERN PACIFIC

1988 Eastern Pacific Tuna Catch Equals 1987 Catch -- Tuna fishermen caught 199,000 metric tons (t) of tuna in the eastern Pacific between January and July 1988, a decline of 1 percent over the same period in 1987. Over 159,500 t, or 80 percent, was yellowfin. Fishermen also caught 39,100 t of skipjack. Compared to 1987, these catches represented a 1 percent decline for yellowfin, and a 4 percent increase for skipjack.

CARIBBEAN

Barbados Swordfish Exports to U.S. are Detained for High Mercury Content -- Barbados fishermen have been complaining that their swordfish exports to the United States are being detained for high mercury levels, while fish caught by U.S. fishermen operating in the Eastern Caribbean are not being detained. FDA officials report that U.S. fishermen operating in U.S. waters are exempt from the automatic detention procedure for swordfish, which went into effect on August 19, 1987. Swordfish caught by U.S. vessels fishing in foreign waters, however, are subject to the same restriction. All such swordfish are subject to detention at the port of entry until inspected by a private sampling lab. Current FDA limits of one part per million mercury content exclude most larger fish. FDA authorities report that the new regulations are controversial, but several U.S. fishing companies which have consistently produced fish meeting the guidelines have applied for and received an exemption from the regulation.

Puerto Rican Tuna Canneries Request Ocean Waste Dumping Permits -- Puerto Rican tuna canneries have requested ocean dumping permits as existing landfills are nearing capacity. Four of the five canneries have fishmeal plants and are having problems disposing of wastes. The press water of fishmeal plants and the wash water from processing plants are causing increasing problems for several companies.

LATIN AMERICA

Brazil-Venezuela Tuna Cooperation Explored -- Five Venezuelan fishing industry representatives visited Brazil to explore the possibility of forming joint ventures with Brazilian firms. The Venezuelans were particularly interested in fishing for tuna and shark off northeast Brazil. The Venezuelan overture was reportedly well received by regional officials and businessmen who are interested in establishing a tuna processing industry in the Northeast.

Colombia to Expand its Tuna Fishery -- Colombia is initiating a commercial tuna fishery. Officials hope to eventually produce $30 million of tuna annually, most of which will be exported. A cannery is currently being built in Cartagena to process some of the fish. The United States imported no tuna from Colombia during 1987 and the first four months of 1988. The company, Atunes de Colombia, says that it began exporting tuna in 1988. There are plans to invest $5 million more in the fishery.

Colombia Outlines Ways for Foreign Vessels to Fish Colombian Waters Foreign vessels can gain access to Colombian fishing grounds in two different ways: 1) by obtaining commercial permits for distant water fishing and 2) by affiliating with a Colombian company which would be granted the permits. Permits are valid for Colombian waters in either the Pacific or Caribbean, but not for both. Permits specify catch quotas based on the size of the vessel and require that part of the catch be marketed in Colombia, depending on the

demand at the time the fish is landed. As Colombia has a limited capacity to process fish, it is likely that as much as 95 percent of the catch will be sold on the international market. The new regulations may enable Ecuadorean tuna fishermen to resume operations off Colombia. Ecuadorean tuna fishermen in the early 1980s caught about 35 percent of their tuna catch in Colombian waters. The Ecuadoreans ceased operating there in 1985, after the Colombian Government prohibited foreign fishing without a license. Colombia at the time lacked licensing procedures, so several Ecuadorean seiners were seized, resulting in a cessation of Ecuadorean fishing in Colombian waters.

Costa Rica and Mexico Discuss Fishing Arrangement -- The Costa Rican Direccion General de Pesca (DGP) and the Mexican Ministry of Agriculture are discussing the possibility of Costa Rica supplying tuna to Mexico. Under the proposed arrangement, Costa Rica would rent or buy three or four Mexican tuna seiners whose catch off Costa Rica would be sold to Mexico. Costa Rican officials reportedly believe that this arrangement would be more beneficial than licensing the Mexican fishermen. Costa Rica also hopes to build a tuna cannery with Mexican help.

Ecuadorean Tuna Catch Decreases in 1987 -- Preliminary figures show that the 1987 Ecuadorean catch decreased to 600,000 mt, 40% below the 1.0 million mt tuna catch in 1986. The decline may have been partly caused by the 1987 El Niño. The catch of sardines, mackerel, and tuna have continued at low levels during January-February 1988. In those two months, 3,900 mt of tuna and 3,000 mt of sardines for canning were landed as well as 139,000 mt of pelagic species for reduction. Ecuadorean fishermen hope the catch will improve with the disappearance of El Niño conditions.

Ecuador Increases Tuna Shipments to U.S.-- Ecuador shipped almost 7,400 mt (live weight equivalent) of tuna to the United States during the first 4 months of 1988, a 20% increase over the 5,700 mt shipped during the same period in 1987. Larger shipments of processed products rather than frozen raw fish accounted for the increase. Ecuadorean exporters shipped 2,000 mt of canned tuna during January-April 1988, compared to only 1,130 mt in the first 4 months of 1987. Shipments of loins and disks were higher as well, increasing from zero to 400 tons. Ecuador is also reporting greater proportions of yellowfin than skipjack in catches. In past years, yellowfin has accounted for only about 30 percent of the total Ecuadorean tuna catch. During the first 6 months of 1988, however, two-thirds of the 13,500 mt of tuna caught by Ecuadorean fishermen was yellowfin. The larger yellowfin catch may enable Ecuadorean companies to expand shipments to Europe and Japan, where demand for that species is strong. Ecuador shipped about 13,000 mt of tuna to the EC in 1987, but only 200 mt to Japan.

Mexico Plans to Expand its Tuna Fishery -- The Mexican Secretaria de Pesca (SEPESCA) recently outlined its plan to continue the expansion of the Mexican tuna fishery. During 1988, two new processing plants, Pescado de Chiapas and Pescado del Colima, are expected to begin operating. The two plants combined will increase Mexico's tuna canning capacity by 30,000 metric tons (t), or 20 percent. SEPESCA estimates that by the end of 1988, Mexican tuna companies will operate 88 tuna seiners, with a total carrying capacity of over 65,000 tons, compared to 74 vessels with a carrying capacity of 56,500 t in 1987. Officials expect this expansion to increase the Mexican fleet's catch potential to almost 200,000 mt annually. SEPESCA officials also indicated that, following the termination of the voluntary tuna export constraints in September 1989, Mexico will be authorized to export as much as 80,000 t of tuna to the United States annually, and hopes to ship no less than 60,000 t annually beginning in 1990. Preliminary catch statistics for the first 6 months of 1988, however, suggest that Mexico is not having a good season. From January to June 1988, Mexican tuna fishermen caught 54,700 mt of tuna, a 7 percent decline from the 58,800 mt caught during the same period in 1987. Most of the Mexican catch is yellowfin.

Mexico Conducts an Exploratory Tuna Longline Fishery -- Mexico is conducting a small, exploratory longline fishery for tuna in the Gulf of Mexico. The fishery has been primarily conducted by Mexican fishermen, but a Mexican-Japanese joint venture, Kosei-Mex, is also participating. Another Mexican-Japanese joint venture, Productos de Mar y Tierra, is not yet operational. These joint venture companies have primarily used Mexican-flag vessels, but one of the Mexican participants, Golpa, Pesca e Industrial, received experimental permits for two foreign-flag longliners in 1988. SEPESCA reports that "Mexico is not now in a position to grant any fishing permits to new businesses... " although an exception will be made for Productos Pesqueros Mexicanos (PPM) affiliates, or Mexican groups which acquire PPM vessels as a result of SEPESCA'S current divestment program.

Mexico Seizes U.S. Fishing Vessels -- The Mexican Navy seized three U.S. fishing vessels during June. The shrimp trawler *Mama Gauri* was seized June 5 with 2 mt of shrimp aboard. Mexican authorities released the vessel June 17 without fines or penalties, primarily because the U.S. vessel was in Mexican waters responding to distress calls from a Mexican vessel, and in fact had picked up survivors. The tuna longliner *Daniel J* was seized June 14, about 60 miles east of Soto la

Marina River with 3.5 mt of tuna aboard. The vessel owners were fined about $9,000 and the vessel's gear was confiscated. Another U.S. tuna longliner, the Boomerang, was also seized by Mexican authorities, and is still being held pending legal action.

Damaged Mexican Tuna Vessels Sold -- In early July 1988, the Mexican Government auctioned four 1,200-ton Mexican tuna seiners, damaged in a January 1988 storm at Ensenada. Three vessels (the *Audez*, the *Centauro del Norte*, and the *Conseco Beta*) were purchased by a Mr. Uribe from the state of Guaymas, who is reportedly new to the tuna business. It is not yet known in which port the vessels will be based. A fourth vessel, the *Marinero Otero* (formerly the *Tuna Oro IV*) was sold to the Comextun company of Mazatlan. Originally purchased for $10-15 million each, the construction contracts for the tuna seiners were guaranteed by the Mexican Government. The Government was forced to assume ownership of 14 tuna seiners several years ago after the private companies that had purchased them defaulted on their loans. The vessels remained idle at Ensenada for about 3 years while the Government sought buyers. The Government finally managed to locate buyers for 8 vessels, but before the sales were finalized, all 14 Government-owned vessels were either sunk, damaged, or run aground in the January storm. *Todos Santos*, a 650-ton tuna seiner, also damaged in the January storm, has been towed out of port and sunk, to serve as an artificial reef.

The Mexican Tuna Fishery in 1987 -- The ownership of the Mexican tuna fleet is divided among three sectors: private companies, cooperatives, and state-owned companies (parastatales). The largest portion of the tuna fleet is owned by 33 private companies, which accounted for nearly 85 percent of the country's 1987 tuna catch. In 1987, these companies operated 43 purse seiners, with a combined carrying capacity of over 41,000 tons. The number of tuna vessels owned by cooperatives and parastatales is not known. Almost all companies and cooperatives received low-interest credits to buy tuna seiners; in addition, the Government continues to assist the companies in refinancing the vessel loans, obtaining foreign exchange, and promoting export sales.

During the 1970s, most Mexican tuna companies landed their catch in Ensenada (where they were based), for shipment to U.S. tuna canneries in southern california. By 1987, however, Mexican tuna fishermen landed most of their catch (107,000 mt) in foreign ports. The U.S. tuna embargo, a strike by an Ensenada labor union, distance from fishing grounds, and low government-fixed domestic tuna prices, have decreased the utility of Ensenada as a tuna port. Because of these factors and the inability of other Mexican portsto handle the growing Mexican tuna fleet, Mexican fishermen now prefer to transship their tuna catch in Panama and other foreign ports.

Mexican Tuna Marketing Company Hopes to Expand Domestic Market -- Exportadores Atuneros Asociados (EXPATUN), a company formed in early 1988 by representatives of about 30 Mexican tuna companies to facilitate the export of Mexican tuna, now hopes to expand the domestic tuna market as well. EXPATUN officials reportedly plan to simultaneously produce higher quality processed tuna for the domestic market and reduce prices by 30 percent. Some observers believe, however, that if EXPATUN successfully improves quality control and reduces costs at domestic canneries, Mexico may also begin to export canned tuna to increase foreign exchange earnings. Mexico does not currently export significant quantities of canned tuna, as the quality and price of the Mexican product is not competitive with that produced by canneries in Thailand and Puerto Rico.

Mexican Tuna Company Buys Shipyard and Cannery -- A new tuna company, Exportadores Atuneros Unidos (EAU), is negotiating for the purchase of a government-owned shipyard and a tuna processing plant. The sale of the shipyard is part of the Government's effort to sell most of the subsidiaries of Productos Pesqueros Mexicano (PPM), the state-owned fishing company. EAU was established in early 1988 by over 30 private Mexican tuna companies in order to promote exports and the integration of the national tuna industry. The company hopes to improve quality controls in the industry, study possible export markets, and eventually operate cold stores in Ensenada and Mazatlan.

Tuna Activity Increases At Panamanian Port -- Panamanian officials reported a sharp increase in tuna activity at Vacamonte during March 1988. Port officials say that the port handled 79 fishing vessels during March, 39 more than during February. Most vessels were shrimp trawlers, but included 10 foreign registered vessels, mostly tuna seiners. Tuna transshipments/landings were 1,600 mt, 60% above February 1988 levels.

IATTC Tuna Laboratory in Panama Expanded -- The IATTC Achotines Laboratory, established in 1983 to study the early life stages of tuna, was expanded in 1987. The expansion of the laboratory, which is located in the Los Santos Province of Panama, includes a seawater reservoir tank and a water circulation system. The work has concentrated on capturing, transferring and maintaining live scombrids. A 10-meter (m) research vessel was also built in 1987 for ichthyoplankton sampling and for studying environmental variables relevant to the growth and survival of juvenile tuna.

Peru and Mexico Discuss Tuna Cooperation -- Peruvian Fisheries Minister Romulo Leon visited Mexico in late July, and met with Mexican Secretary of Fisheries Pedro Ojeda Paullada. Leon and Ojeda discussed possible tuna cooperation. Ojeda also reportedly offered to finance, and build 10 fishing vessels for Peru. The 500-t multipurpose vessels would cost $2 million each. Peruvian officials are studying the Mexican offer. The two Ministers, in addition, discussed technical and economic fisheries cooperation. A Mexican delegation will visit Peru in September to study possible expanded cooperation in detail.

NORTH AMERICA

U.S. Embargoes Certain Imported ETP Yellowfin Tuna -- Yellowfin tuna caught by purse seine in the eastern tropical Pacific (ETP) by Venezuela, Ecuador, Vanuatu, Panama, Spain, Cayman Islands and Costa Rica cannot be imported to the United States after October 15, 1988, according to new U.S. tuna import regulations under the Marine Mammal Protection Act. Those nations failed to document their conformance with U.S. dolphin protection regulations by the August 17, 1988, deadline as required by new U.S. regulations. However, each affected nation may apply for a finding of conformance at any time but must submit the application 120 days before it wishes to export yellowfin tuna to the United States. The embargo could mean an annual loss to U.S. tuna processors of about 35,000 st of yellowfin tuna valued at $30 million and could impact operations at five Puerto Rico canneries.

U.S. Longliners Operate in the Eastern Caribbean -- About 50-55 U.S. longliners are currently operating in the Eastern Caribbean out of Puerto Rico. Many fishermen are reporting good catches, fishing yellowfin during the day and swordfish at night.

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